Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**1.** Which of these graphs represents a function?

|  |  |
| --- | --- |
| **W.** | **X.** |
| **Y.** | **Z.** |

|  |  |  |
| --- | --- | --- |
|  | **A.** | X |

|  |  |  |
| --- | --- | --- |
|  | **B.** | Z |

|  |  |  |
| --- | --- | --- |
|  | **C.** | Y |

|  |  |  |
| --- | --- | --- |
|  | **D.** | W |

**2.** Which of these t-tables represents a function?

|  |  |  |  |
| --- | --- | --- | --- |
| **W.** | **X.** | **Y.** | **Z.** |

|  |  |  |
| --- | --- | --- |
|  | **A.** | Z |

|  |  |  |
| --- | --- | --- |
|  | **B.** | W |

|  |  |  |
| --- | --- | --- |
|  | **C.** | X |

|  |  |  |
| --- | --- | --- |
|  | **D.** | Y |

**3.** Do the ordered pairs below represent a relation, a function, both a relation and a function, or neither a relation nor a function?

(-3,2) , (1,-6) , (4,-12) , (8,-20)

|  |  |  |
| --- | --- | --- |
|  | **A.** | both a relation and a function |

|  |  |  |
| --- | --- | --- |
|  | **B.** | function only |

|  |  |  |
| --- | --- | --- |
|  | **C.** | relation only |

|  |  |  |
| --- | --- | --- |
|  | **D.** | neither a relation nor a function |

**4.** Think about the vertical line test and answer the following question. Would a vertical line be a relation, a function, both a relation and a function, or neither a relation nor a function?

|  |  |  |
| --- | --- | --- |
|  | **A.** | function only |

|  |  |  |
| --- | --- | --- |
|  | **B.** | relation only |

|  |  |  |
| --- | --- | --- |
|  | **C.** | neither a relation nor a function |

|  |  |  |
| --- | --- | --- |
|  | **D.** | both a relation and a function |

**5.** Which of the following relations describes a function?

|  |  |  |
| --- | --- | --- |
|  | **A.** | { (0, 0), (1, 1), (1, -1), (4, 2) } |

|  |  |  |
| --- | --- | --- |
|  | **B.** | { (-4, 2), (-1, -1), (-1, 1), (0, 0) } |

|  |  |  |
| --- | --- | --- |
|  | **C.** | { (0, 0), (1, 1), (4, 2), (9, 3) } |

|  |  |  |
| --- | --- | --- |
|  | **D.** | { (0, 0), (1, 1), (2, -2), (2, 2) } |

**6.** Which of these mappings is a function?

|  |  |  |  |
| --- | --- | --- | --- |
| **W.** | **X.** | **Y.** | **Z.** |

|  |  |  |
| --- | --- | --- |
|  | **A.** | X |

|  |  |  |
| --- | --- | --- |
|  | **B.** | Z |

|  |  |  |
| --- | --- | --- |
|  | **C.** | Y |

|  |  |  |
| --- | --- | --- |
|  | **D.** | W |

**7.** Which of these t-tables represents a function?

|  |  |  |  |
| --- | --- | --- | --- |
| **W.** | **X.** | **Y.** | **Z.** |

|  |  |  |
| --- | --- | --- |
|  | **A.** | W |

|  |  |  |
| --- | --- | --- |
|  | **B.** | X |

|  |  |  |
| --- | --- | --- |
|  | **C.** | Z |

|  |  |  |
| --- | --- | --- |
|  | **D.** | Y |

**8.** Which of these graphs represents a function?

|  |  |
| --- | --- |
| **W.** | **X.** |
| **Y.** | **Z.** |

|  |  |  |
| --- | --- | --- |
|  | **A.** | Y |

|  |  |  |
| --- | --- | --- |
|  | **B.** | W |

|  |  |  |
| --- | --- | --- |
|  | **C.** | Z |

|  |  |  |
| --- | --- | --- |
|  | **D.** | X |

**9.** Which of the following tables represents a function?

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **A.** | |  |  |  |  |  | | --- | --- | --- | --- | --- | | ***x*** | -10 | -9 | -4 | -4 | | ***y*** | 23 | 21 | 23 | 22 | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **B.** | |  |  |  |  |  | | --- | --- | --- | --- | --- | | ***x*** | -10 | -9 | -10 | 5 | | ***y*** | 23 | 23 | 29 | 22 | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **C.** | |  |  |  |  |  | | --- | --- | --- | --- | --- | | ***x*** | -10 | -9 | -4 | -9 | | ***y*** | 23 | 21 | 23 | 22 | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **D.** | |  |  |  |  |  | | --- | --- | --- | --- | --- | | ***x*** | -10 | -9 | -4 | 5 | | ***y*** | 23 | 21 | 29 | 23 | |

**10.** Which of these t-tables represents a function?

|  |  |  |  |
| --- | --- | --- | --- |
| **W.** | **X.** | **Y.** | **Z.** |

|  |  |  |
| --- | --- | --- |
|  | **A.** | W |

|  |  |  |
| --- | --- | --- |
|  | **B.** | Z |

|  |  |  |
| --- | --- | --- |
|  | **C.** | X |

|  |  |  |
| --- | --- | --- |
|  | **D.** | Y |

**11.** Which of the following graphs is not a function?

|  |  |
| --- | --- |
| **W.** | **X.** |
| **Y.** | **Z.** |

|  |  |  |
| --- | --- | --- |
|  | **A.** | W and X |

|  |  |  |
| --- | --- | --- |
|  | **B.** | Z |

|  |  |  |
| --- | --- | --- |
|  | **C.** | X and Y |

|  |  |  |
| --- | --- | --- |
|  | **D.** | W, X, Y and Z |

**12.** Which of the following relations describes a function?

|  |  |  |
| --- | --- | --- |
|  | **A.** | { (-3, 3), (-2, -2), (-2, 2), (0, 0) } |

|  |  |  |
| --- | --- | --- |
|  | **B.** | { (0, 0), (2, -2), (2, 2), (3, 3) } |

|  |  |  |
| --- | --- | --- |
|  | **C.** | { (-3, 3), (-2, 2), (2, 2), (3, 3) } |

|  |  |  |
| --- | --- | --- |
|  | **D.** | { (-2, 0), (0, 2), (2, 0), (0, -2) } |

**13.** Which of the following represents a relation and not a function?

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **A.** | |  |  |  |  |  | | --- | --- | --- | --- | --- | | ***x*** | -7 | -5 | -7 | 1 | | ***y*** | 28 | 26 | 34 | 28 | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **B.** | |  |  |  |  |  | | --- | --- | --- | --- | --- | | ***x*** | 7 | -5 | 11 | -7 | | ***y*** | 28 | 26 | 34 | 28 | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **C.** | |  |  |  |  |  | | --- | --- | --- | --- | --- | | ***x*** | -7 | -5 | -1 | 1 | | ***y*** | 28 | 26 | 34 | 28 | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **D.** | |  |  |  |  |  | | --- | --- | --- | --- | --- | | ***x*** | -7 | -5 | 7 | 11 | | ***y*** | 28 | 26 | 34 | 28 | |

**14.** Which relation diagram represents a function?

|  |  |
| --- | --- |
| **W.** | **X.** |
| **Y.** | **Z.** |

|  |  |  |
| --- | --- | --- |
|  | **A.** | W |

|  |  |  |
| --- | --- | --- |
|  | **B.** | Z |

|  |  |  |
| --- | --- | --- |
|  | **C.** | X |

|  |  |  |
| --- | --- | --- |
|  | **D.** | Y |

**15.**

Determine whether this picture is an example of a function, relation, function and relation, or neither relation nor function.

|  |  |  |
| --- | --- | --- |
|  | **A.** | relation only |

|  |  |  |
| --- | --- | --- |
|  | **B.** | neither function nor relation |

|  |  |  |
| --- | --- | --- |
|  | **C.** | function only |

|  |  |  |
| --- | --- | --- |
|  | **D.** | function and relation |

**16.** Which of these graphs represents a function?

|  |  |
| --- | --- |
| **W.** | **X.** |
| **Y.** | **Z.** |

|  |  |  |
| --- | --- | --- |
|  | **A.** | W |

|  |  |  |
| --- | --- | --- |
|  | **B.** | Z |

|  |  |  |
| --- | --- | --- |
|  | **C.** | X |

|  |  |  |
| --- | --- | --- |
|  | **D.** | Y |

**17.**

Using the vertical line test, determine if the graph above shows a relation, a function, both a relation and a function, or neither a relation nor a function.

|  |  |  |
| --- | --- | --- |
|  | **A.** | function only |

|  |  |  |
| --- | --- | --- |
|  | **B.** | neither a relation nor a function |

|  |  |  |
| --- | --- | --- |
|  | **C.** | both a relation and a function |

|  |  |  |
| --- | --- | --- |
|  | **D.** | relation only |

**18.** Which of these t-tables represents a function?

|  |  |  |  |
| --- | --- | --- | --- |
| **W.** | **X.** | **Y.** | **Z.** |

|  |  |  |
| --- | --- | --- |
|  | **A.** | Y |

|  |  |  |
| --- | --- | --- |
|  | **B.** | X |

|  |  |  |
| --- | --- | --- |
|  | **C.** | W |

|  |  |  |
| --- | --- | --- |
|  | **D.** | Z |

**19.** Which of the following relations is a function?

|  |  |  |
| --- | --- | --- |
|  | **A.** | (0, 4), (-3, 6), (0, 3), (-6, 2) |

|  |  |  |
| --- | --- | --- |
|  | **B.** | (0, 0), (-3, 3), (5, 1), (-3, 5) |

|  |  |  |
| --- | --- | --- |
|  | **C.** | (0, 4), (-3, 2), (5, 1), (-6, 2) |

|  |  |  |
| --- | --- | --- |
|  | **D.** | (5, 1), (-3, 4), (0, 1), (5, 2) |

**20.** Which of the following relations is a function?

|  |  |  |
| --- | --- | --- |
|  | **A.** | (0, 4), (-4, 2), (7, 1), (-8, 2) |

|  |  |  |
| --- | --- | --- |
|  | **B.** | (0, 4), (-4, 6), (0, 3), (-8, 2) |

|  |  |  |
| --- | --- | --- |
|  | **C.** | (0, 0), (-4, 3), (7, 1), (-4, 5) |

|  |  |  |
| --- | --- | --- |
|  | **D.** | (7, 1), (-4, 4), (0, 1), (7, 2) |

# Answers

1. A   
2. A   
3. A   
4. B   
5. C   
6. D   
7. A   
8. B   
9. D   
10. A   
11. B   
12. C   
13. A   
14. B   
15. A   
16. C   
17. D   
18. D   
19. C   
20. A

# Explanations

1. Use the vertical line test to determine if the graphs represent a function.  
  
The only graph given that passes the vertical line test is **X**.

2. A function maps each domain element to only one range element.  
  
The t-table **Z** is the only table that does not show a domain element paired with two or more range elements.

3. A *relation* is a set of one or more ordered pairs.  
  
A *function* is a relation in which each element of the domain is paired with EXACTLY one element of the range.  
  
In this case, there is one *y*-coordinate for every *x*-coordinate.  
  
The vertical line test can be used to determine this.  
  
Therefore, it is **both a relation and a function**.

4. A *relation* is a set of one or more ordered pairs.  
  
A *function* is a relation in which each element of the domain is paired with EXACTLY one element of the range.  
  
*The Vertical-Line Test:* Given the graph of a relation, if a vertical line can be drawn that does not cross any of the graphs in more than one place, it is a function.  
  
If the relation being tested is a vertical line, then any *x* in the domain of the relation (which there would be only one) will correspond with every *y* of the range (an infinite number of points).  
  
So, a vertical line can be drawn that crosses the graph in more than one place (the vertical line itself).  
  
Therefore, a vertical line is not a function, and it is a **relation only**.

5. A function is a set of ordered pairs such that for each domain element there is only one range element.  
  
The set of ordered pairs **{ (0, 0), (1, 1), (4, 2), (9, 3) }** is the only set that does not pair a domain element with two or more range elements.

6. A function maps each domain element to only one range element.  
  
The only mapping that does not map a domain element to two or more range elements is **W**.

7. A function maps each domain element to only one range element.  
  
The t-table **W** is the only table that does not show a domain element paired with two or more range elements.

8. Use the vertical line test to determine if the graphs represent a function.  
  
The only graph given that passes the vertical line test is **W**.

9. A *relation* is a set of one or more ordered pairs.  
  
A *function* is a relation in which each element of the domain is paired with EXACTLY one element of the range.  
  
In other words, a function does not have two or more *y*-coordinates for any *x*-coordinate, which is shown in the table below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***x*** | -10 | -9 | -4 | 5 |
| ***y*** | 23 | 21 | 29 | 23 |

10. A function maps each domain element to only one range element.  
  
The t-table **W** is the only table that does not show a domain element paired with two or more range elements.

11. A *relation* is a set of one or more ordered pairs.  
  
A *function* is a relation in which each element of the domain is paired with EXACTLY one element of the range.  
  
*The Vertical-Line Test:* Given the graph of a relation, if a vertical line can be drawn that does not cross any of the graphs in more than one place, it is a function.  
  
Therefore, **Z** is not a function.

12. A function is a set of ordered pairs such that for each domain element there is only one range element.  
  
The set of ordered pairs **{ (-3, 3), (-2, 2), (2, 2), (3, 3) }** is the only set that does not pair a domain element with two or more range elements.

13. A *relation* is a set of one or more ordered pairs.  
  
A *function* is a relation in which each element of the domain is paired with EXACTLY one element of the range.  
  
In the table below, there are two *y*-coordinates for the *x*-coordinate -7. Therefore, it is a relation only and not a function.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***x*** | -7 | -5 | -7 | 1 |
| ***y*** | 28 | 26 | 34 | 28 |

14. For a relation to be a function, each input value can only correspond to one output value. The relation diagram where each input value has exactly one arrow drawn to an output value will represent a function.  
  
Therefore, diagram **Z** represents a function.

15. A *relation* is a set of one or more ordered pairs.  
  
A *function* is a relation in which each element of the domain is paired with EXACTLY one element of the range.  
  
*The Vertical Line Test:* Given the graph of a relation, if a vertical line can be drawn that crosses the graph in more than one place, then the relation is not a function.  
  
Since the graph does not pass the vertical line test, it is not a function, it is a **relation only**.

16. Use the vertical line test to determine if the graphs represent a function.  
  
The only graph given that passes the vertical line test is **X**.

17. A *relation* is a set of one or more ordered pairs.  
  
A *function* is a relation in which each element of the domain is paired with EXACTLY one element of the range.  
  
*The Vertical-Line Test:* Given the graph of a relation, if a vertical line can be drawn that does not cross any of the graph in more than one place, it is a function.  
  
Any vertical line drawn between *x* = -7.5 and *x* = 0 and any vertical line drawn between *x* = 0 and *x* = 7.5 will cross the graph in more than one place.  
  
Therefore, the graph is not a function, and it is a **relation only**.

18. A function maps each domain element to only one range element.  
  
The t-table **Z** is the only table that does not show a domain element paired with two or more range elements.

19. A *relation* is a set of one or more ordered pairs.  
  
A *function* is a relation in which each element of the domain is paired with EXACTLY one element of the range.  
  
In other words, a function does not have two or more *y*-coordinates for any *x*-coordinate, which is **(0, 4), (-3, 2), (5, 1), (-6, 2)**.

20. A *relation* is a set of one or more ordered pairs.  
  
A *function* is a relation in which each element of the domain is paired with EXACTLY one element of the range.  
  
In other words, a function does not have two or more *y*-coordinates for any *x*-coordinate, which is **(0, 4), (-4, 2), (7, 1), (-8, 2)**.